

WHAT IS CLAIMED IS

1. An electronic diving watch comprising a sealed housing containing a clock movement which is surmounted by a dial, the watch comprising at least first graduations, said clock movement comprising electronic circuits which are able to produce time signals intended for motor means which control respectively at least a  
5 first and a second analog display organs, said display organs being disposed above the dial in order to display the current time in a first time operating mode, the watch comprising furthermore a pressure sensor which is able to produce electrical signals which are representative of the surrounding pressure and to supply said signals to said electronic circuits, the diving watch having at least a second operating mode, or  
10 diving mode, in which a display of data relating to the practise of diving is provided, wherein said first graduations serve in particular for indicating a depth, wherein said electronic circuits comprise first means which are able to control the first display organ, in said diving mode, in order to indicate the depth in conjunction with said first graduations and, wherein said electronic circuits likewise comprise second means  
15 which are able to define almost continually a minimum depth which is not to be exceeded by a wearer of the watch during the ascent from a dive, calculated from a substantially continuous decompression algorithm, and to control said second display organ in order to indicate said depth which is not to be exceeded in conjunction with said first graduations substantially in real time.
- 20 2. The watch according to claim 1, wherein said second means are furthermore able to define discontinuous decompression parameters comprising at least one stage to be effected during the ascent from a dive, calculated from said algorithm, a stage being in particular defined by its depth and its duration, and to control sequentially said second display organ, in said diving mode, in order to  
25 indicate, in the first instance, the depth of the stages to be effected during the ascent in conjunction with said first graduations and in order to indicate, in the second instance, that the diver can resurface.
3. The diving watch according to claim 2, wherein said electronic circuits  
30 comprise an integrated circuit which comprises in particular a time base and is able to define the respective depths and durations of said decompression stages which are to be effected, in particular from signals which are generated by the pressure sensor, the integrated circuit being furthermore able to effect a measurement of the time interval when the momentary depth attains and maintains itself at a value which is equal to the depth defined for one of said stages and to control said second display organ in order

to indicate the depth of a following stage if the effected time interval measurement has attained a value at least equal to the duration defined for said stage.

4. The diving watch according to claim 2, further comprising additional graduations comprising at least a first zone in conjunction with which said second display organ is able to indicate to the wearer of the watch that his body is undergoing physiological modifications, due to the practise of diving, with respect to his normal state.

5. The diving watch according to claim 4, wherein said first graduations comprise a second zone which preferably has a different visual appearance to that of said first zone, said second means being able to control said second display organ in order to indicate furthermore to the wearer of the watch, in conjunction with said second zone, that his body is undergoing significant physiological modifications linked to the practise of diving.

6. The diving watch according to claim 5, wherein said first and second zones extend over a sector which has an angular opening at the top of at least 15 degrees, preferably 30 degrees, and wherein said electronic circuits comprise additional means in order to control said second display organ, in the diving mode, in order to indicate an altitude which is not to be exceeded, in conjunction with the graduations which are situated in said first and second zones, said altitude depending upon said physiological modifications which are undergone by the body of the wearer of the watch.

7. The diving watch according to claim 2, further comprising at least one control member, the movements of which are detected by said electronic circuits, and wherein these latter are able to control at least said first display organ, in the diving mode, in order that it indicates the maximum depth attained during a dive in progress in response to an action on said control member.

8. The diving watch according to claim 2, wherein said electronic circuits are able to control said second display organ, in order to indicate at least one stage with predefined duration and depth, during the ascent, in conjunction with said first graduations.

9. The diving watch according to claim 2, wherein means are provided in order to detect the start of a dive and to automatically actuate the diving mode.

10. The diving watch according to claim 2, wherein the first and second analog display organs are respectively a minute hand and an hour hand.

11. The diving watch according to claim 2, further comprising additional means which are able to control at least a first liquid crystal screen in order to display in particular at least a first piece of information relating to the practise of diving, which

information is complementary to information which is supplied by said first and second display organs.

12. The diving watch according to claim 11, wherein said additional means are likewise able to control at least a second liquid crystal screen in order to display at least a second piece of information relating to the practise of diving, which information is complementary to information supplied by said first and second (11) display organs.

13. The diving watch according to claim 2, wherein, when it comprises at least one control member, means are provided in order to actuate an additional operating mode, or historical mode, in response to a first action on said control member, from the time operating mode, in which each of said display organs reproduces its actions from the last dive with graduations of time and depth which are adapted to the parameters of said dive.

14. The diving watch according to claim 13, wherein the electronic circuits are able to store the parameters of at least the last two dives, to select the parameters of one of said last dives in response to at least a first action on a control member and to actuate said corresponding historical mode in response to at least a second action on a control member.

15. The diving watch according to claim 14 when it is dependent upon claim 11 or 12, wherein the electronic circuits are able to control at least one liquid crystal screen in order to display at least identification data of that of said last dives which has been selected for said historical mode.

16. The diving watch according to claim 15, wherein the electronic circuits are able to control said liquid crystal screen in order to display furthermore information relating to the practise of diving, which information is complementary to information indicated by said display organs in the historical mode.

17. The diving watch according to claim 2, further comprising a third analog display organ, the electronic circuits of the watch being able to control said third display organ in order that it indicates opposite said first graduations, in the diving mode, information relating to a depth, which information is complementary to information indicated by said first and second analog display organs.

18. The diving watch according to claim 17, wherein it comprises furthermore means for measuring the gas pressure in the cylinder of the user of the watch, the electronic circuits being able to calculate, in particular from said gas pressure measurement, the remaining autonomy substantially in real time and to deduce therefrom a depth value which is not to be exceeded by the user, said electronic circuits being able to control said third display organ in order that it indicates the value of said depth which is not to be exceeded, in relation to said first graduations.

19. The diving watch according to claim 17, wherein said third display organ indicates the seconds in time mode.

20. A method of displaying decompression stages to be effected during the ascent from a dive on an electronic diving watch with an analog display, the watch comprising a sealed housing containing a clock movement which is surmounted by a dial, at least first graduations which serve in particular for indicating a depth, said clock movement comprising electronic circuits which comprise a time base and are able to generate time signals intended for motor means which control respectively at least a first and a second analog display organs, said display organs being disposed above the dial in order to display the current time in a first time operating mode, the watch comprising furthermore a pressure sensor which is able to produce electrical signals which are representative of the surrounding pressure and to supply said electrical signals to said electronic circuits, said electronic circuits likewise comprising memory means, in which in particular there is stored a computer program which is obtained on the basis of a decompression algorithm and is able to define at least a duration and a depth of at least one decompression stage, said electronic circuits being furthermore able to process in particular the signals which are generated by the pressure sensor in order to validate the observance of said stage(s) which is/are to be effected during the ascent, the diving watch comprising at least a second operating mode, or diving mode, in which a display of data relating to the practise of diving is provided, the process comprising in particular the steps comprising:

- a) processing of the signals generated by said pressure sensor in relation to said time signals when they are representative of a dive,
- b) transmitting the results of said processing to said memory means,
- 25 c) controlling said first display organ substantially in real time in order that it indicates the depth with respect to said first graduations,
- d) defining at least one stage to be effected during the ascent when the results of said processing by means of the algorithm which is used require it, a stage being in particular defined by its depth and its duration,
- 30 e) controlling said second display organ in order that it is positioned opposite the indication of the first graduations corresponding to the depth of the first stage to be effected,
- f) controlling said second display organ when the results of said processing indicate that said stage has been effected correctly, in order that it is positioned
- 35 opposite the indication of the depth of the following stage, in the case where there still remains at least one stage to be effected, before resuming step f), or in order that it is positioned opposite the additional graduations, which are placed on the dial, indicating

to a wearer of the diving watch that he can resurface if the validated stage is the last stage to be effected.

21. The display method according to claim 20, when the diving watch likewise comprises at least one liquid crystal screen, wherein in step e), said screen  
5 displays furthermore the remaining duration of the stage in progress, said duration being displayed substantially in real time dependent upon the results of said processing.

22. The display method according to claim 20, wherein, when the results of said processing by means of the algorithm which is used do not define a  
10 decompression stage to be effected during the ascent, it is provided that a stage is displayed, termed a comfort stage, the duration and the depth of which have respectively predefined values, by resuming steps e) and f) as defined in claim 20.